

REMARKS

Applicant thanks the Examiner for acknowledging the claim for foreign priority and receipt of certified copies of the priority documents and for initialing and considering the references on the PTO-1449 form submitted with the Information Disclosure Statement on October 26, 2000.

Claims 1-10 are all the claims pending in the application. Claims 1, 2, and 7 are independent claims. Independent claims 1, 2, and 7 are hereby amended to include the recitation that "the sipe is twisted such that a self alignment torque is generated by the block so as to reduce a self alignment torque generated due to the cords provided parallel to each other in an outermost reinforcing layer".

Claim Rejections 35 U.S.C. § 112

Claims 2-6 are rejected under 35 U.S.C. § 112, second paragraph, as being allegedly indefinite. Claims 2, 5, and 6 are hereby editorially amended as suggested by the Examiner.

Claim Rejections 35 U.S.C. § 103

Claims 1 and 8-10

Claim 1 is rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over JP 9-323510 in view of Blow, Rubber Technology and Manufacture. Claims 8-10 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over JP '510 in view of Blow, and further in view of Mosley et al. (US 5,669,993).

Applicant submits that amended claim 1 is allowable at least because none of the recited art teaches or suggests a pneumatic tire in which "the sipe is twisted such that a self alignment

torque is generated by the block so as to reduce a self alignment torque generated due to the cords provided parallel to each other in an outermost reinforcing layer”, as is claimed.

In certain pneumatic tires having reinforcing layers made up of cords, the angle of inclination of the cords within the outermost reinforcing layer with respect to the tire circumferential direction causes the cords when driven to lean toward the tire circumferential direction. This generates a self alignment torque (SAT), or force to restore the tire distorted by ground contact pressure to the original tire shape (Specification, page 2, para. 3).

In addition, in a tire in which the sipe of a block-shaped land portion is twisted, the block-shaped land portion of the tire rotationally deforms when the block-shaped land portion is compressed. Due to this deformation, a SAT is exerted in a direction opposite the twisting direction.

In the claimed invention, by arranging the sipe so that it is twisted in an appropriate direction, the “sipe is twisted such that a self alignment torque is generated by the block so as to reduce a self alignment torque generated due to the cords provided parallel to each other in an outermost reinforcing layer”.

Although JP ‘510 may show a pneumatic tire having a block with a twisted sipe and Blow may show a tire with a plurality of reinforcing layers made up of cords, these references do not suggest a pneumatic tire in which the sipe is twisted “such that a self alignment torque is generated by the block so as to reduce a self alignment torque generated due to the cords”. In fact, there is no teaching or suggestion that the sipe should be positioned relative to the cords in any particular relationship or to achieve any particular objective. Absent the proscribed use of

hindsight, there would have been no teaching or suggestion to modify the tire taught by JP '510 so that the SAT generated by the block with a twisted sipe would reduce the SAT generated by the cords of the outermost reinforcing layer. If it were to happen, it would only be by chance, as there is no indication anywhere in the references for such a feature. Clearly then, any potential rejection on this basis would be predicated on an impermissible use of hindsight.

As such, Applicant submits that claim 1 is allowable over the cited art for at least the reasons discussed above, and that claims 8-10 are also allowable at least because of their dependency, directly or indirectly, from claim 1.

Claims 2-6

Claims 2-6 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over JP '510 in view of Blow, and in further view of WO 96/01190 or Lagnier (US 5,783,002).

Independent claim 2 is amended in a manner similar to claim 1 discussed above. As such, Applicant submits that claim 2 is allowable at least for the reasons discussed above with respect to claim 1 and because neither WO '190 nor Lagnier cures the deficiencies in the combination of JP '510 and Blow discussed above.

In addition, claims 3-6 are also allowable at least because of their dependency directly from claim 2.

Claim 7

Claims 7 is rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over JP '510 in view of Blow, and in further view of JP 2-299910 or JP 62-286805.


Independent claim 7 is amended in a manner similar to claim 1 discussed above. As such, Applicant submits that claim 7 is allowable at least for the reasons discussed above with respect to claim 1 and because neither JP '910 nor JP '805 cures the deficiencies in the combination of JP '510 and Blow discussed above.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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Art Unit 1733

APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The claims are amended as follows:

1. (Amended) A pneumatic tire comprising:

a plurality of reinforcing layers in each of which cords, which are inclined at a predetermined angle with respect to a tire circumferential direction, are provided parallel to each other;

a tread provided on a top of said reinforcing layers which are laminated; and

a block-shaped land portion having a sipe, said block-shaped land portion being defined on a tread surface by main grooves formed in the tire circumferential direction and by lug grooves formed in a direction intersecting with the main grooves;

wherein said sipe is shaped so as to be twisted around a first central axis of twisting extending in a tire radial direction in the block shaped land portion and a second central axis of twisting extending substantially in a tire transverse direction, a position P1 of said first central axis of twisting in a region between one end surface of the block-shaped land portion and another end surface in the tire transverse direction and a position P2 of said central axis of twisting in a region between a contact patch area and a bottom of the sipe in the tire radial direction being within ranges satisfying the following expressions:

$$0.2W \leq P1 \leq 0.8W$$

$$0.2F \leq P2 \leq 0.6F$$

wherein P1, P2 represent the position of the first and second central axes of twisting; W represents a distance from one end surface to the other end surface of the block-shaped land portion in the tire transverse direction; and F represents a distance from the contact patch area to the bottom of the sipe in the tire radial direction; and

wherein the sipe is twisted such that a self alignment torque is generated by the block so as to reduce a self alignment torque generated due to the cords provided parallel to each other in an outermost reinforcing layer.

2. (Amended) A pneumatic tire comprising:

a plurality of reinforcing layers in each of which cords, which are inclined at a predetermined angle with respect to a tire circumferential direction, are provided parallel to each other;

a tread provided on a top of said reinforcing layers which are laminated; and

a block-shaped land portion having a sipe, said block-shaped land portion being defined on a tread surface by main grooves formed in the tire circumferential direction and by lug grooves formed in a direction intersecting with the main grooves;

wherein said sipe is shaped so as to have a first protruding portion protruding in a first direction with respect to a virtual central plane and a second protruding portion protruding in a second direction opposite the first direction across the virtual central plane, said sipe including a surface portion exposed on a contact patch area of said block-shaped land portion and a bottom

portion formed in a bottom of the sipe, the virtual central plane and thereby said sipe being twisted from the surface portion toward the bottom portion; and

wherein the sipe is twisted such that a self alignment torque is generated by the block so as to reduce a self alignment torque generated due to the cords provided parallel to each other in an outermost reinforcing layer.

5. (Twice Amended) A pneumatic tire according to claim 2, wherein said virtual central plane and thereby said sipe is shaped so as to be twisted around a first central axis of twisting extending in the tire radial direction in said block-shaped land portion, a position P1 of said first central axis of twisting in a region between one end surface of the block-shaped land portion and the other end surface in the tire transverse direction being within a range satisfying the following relational expression:

$$0.2W \leq P1 \leq 0.8W$$

wherein P1 represents the position of the first central axis of twisting; and W represents a distance from one end surface to the other end surface of the block-shaped land portion in the tire transverse direction.

6. (Twice Amended) A pneumatic tire according to claim 2, wherein said virtual central plane and thereby said sipe is shaped so as to be twisted around a second central axis of twisting extending substantially in the tire transverse direction in said block-shaped land portion, a position P2 of said second central axis of twisting in a region between the contact patch area and

the bottom of the sipe in the tire radial direction being within a range satisfying the following relational expression:

$$0.2F \leq P2 \leq 0.6F$$

wherein P2 represents the position of the second central axis of twisting; and F represents a distance from the contact patch area to the bottom of the sipe in the tire radial direction.

7. (Amended) A pneumatic tire comprising:

a plurality of reinforcing layers in each of which cords, which are inclined at a predetermined angle with respect to a tire circumferential direction, are provided parallel to each other;

a tread provided on a top of said reinforcing layers which are laminated; and

a block-shaped land portion having a sipe, said block-shaped land portion being defined on a tread surface by main grooves formed in the tire circumferential direction and by lug grooves formed in a direction intersecting with the main grooves;

wherein said sipe is shaped as a closed loop which is connected with neither said main groove nor said lug groove, said sipe including a surface portion exposed on a contact path area of the block shaped land portion and a bottom portion formed in a bottom of a sipe, the sipe being twisted from said surface portion toward said bottom portion; and

wherein the sipe is twisted such that a self alignment torque is generated by the block so as to reduce a self alignment torque generated due to the cords provided parallel to each other in an outermost reinforcing layer.